

CLAIMS:

1. A method comprising:
receiving data packets in one or more interface cards according to a multi-link
5 protocol;
sending the data packets to a multi-link service card for sequencing; and
sending the sequenced data packets to the interface cards for communication to a
destination device over a computer network.
- 10 2. The method of claim 1, wherein the multi-link service card is not directly coupled
to any of the links.
3. The method of claim 1, wherein the multi-link service card is integrated with one
of the interface cards.
- 15 4. The method of claim 1, further comprising:
sending the data packets from one or more interface cards to the destination
device over multiple links according to the multi-link protocol.
- 20 5. The method of claim 4, further comprising, prior to sending the sequenced data
packets to the one or more interface cards:
sending the data packets to the multi-link service card for fragmentation.
6. The method of claim 1, further comprising:
25 prioritizing the sequenced data packets to provide quality of service prior to
sending the sequenced data packets to the interface cards.
7. A method comprising:
receiving a set of fragments from a plurality of links in one or more interface
30 cards according to a multi-link protocol, the set of fragments collectively comprising an
unsequenced data packet;

sending the fragments to a multi-link service card for sequencing; and
sending the sequenced fragments as a sequenced data packet to the one or more
interface cards for communication to a destination device over a computer network.

5 8. The method of claim 7, wherein the multi-link service card is not directly coupled
to any of the links.

9. The method of claim 7, wherein the multi-link service card is integrated with one
of the interface cards.

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10. The method of claim 7, further comprising:
sending the fragments from one or more interface cards to the destination device
over multiple links according to the multi-link protocol.

15 11. The method of claim 10, further comprising, prior to sending the fragments from
one or more interface cards:
sending the fragments to the multi-link service card for fragmentation.

12. A method comprising:
20 receiving a set of data blocks from a plurality of links according to a multi-link
protocol, and
sequencing the data blocks in a first multi-link service card.

13. The method of claim 12, wherein the data blocks are fragments, the method
25 further comprising building a packet from the fragments in the first multi-link service
card.

14. The method of claim 13, further comprising fragmenting the packet in the first
multi-link service card.

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15. The method of claim 14, further comprising sending the fragmented packet to a destination device over a computer network.
16. The method of claim 12, wherein the multi-link service card is not directly
5 coupled to any links.
17. The method of claim 12, the method further comprising assembling the data blocks in a second multi-link service card.
- 10 18. The method of claim 12, further comprising prioritizing the data blocks in the multi-link service card.
19. A router comprising:
at least one interface card for receiving a set of data blocks from a source within a
15 computer network according to a multi-link protocol,
a multi-link service card, and
a routing control unit coupled to the interface card and the multi-link service card to forward the set of data blocks to the multi-link service card for sequencing.
- 20 20. The router of claim 19, wherein the routing control unit includes a packet forwarding engine coupled to the interface card and the multi-link service card.
21. The router of claim 20, wherein the routing control unit includes a interface card concentrator that couples the interface card and the multi-link service card to the packet
25 forwarding engine.
22. The router of claim 20, wherein the routing control unit includes a routing engine coupled to the packet forwarding engine.
- 30 23. The router of claim 22, wherein the routing engine includes a routing table.

24. The router of claim 19, wherein the data blocks are data packets.
25. The router of claim 19, wherein the data blocks are data fragments.
- 5 26. The router of claim 19, further comprising a plurality of interface cards.
27. The router of claim 19, further comprising a plurality of multi-link service cards.
28. The router of claim 19, wherein the routing control unit forwards sequenced data
10 blocks to the multi-link service card for fragmentation.
29. A router comprising a set of interface cards, wherein the interface cards include
an interface card for receiving data blocks from a computer network and an interface card
for sequencing the data blocks.
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30. The router of claim 29, wherein the data blocks are data packets.
31. The router of claim 29, wherein the data blocks are data fragments.
- 20 32. A router comprising a set of interface cards, wherein the interface cards include
an interface card for receiving data blocks from a computer network and an interface card
for fragmenting the data blocks.
33. The router of claim 32, wherein the data blocks are data packets.
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34. A multi-link service card comprising:
an input logic unit that receives data blocks,
a sequencer unit coupled to the input logic unit for sequencing the data blocks,
and
30 an output logic unit coupled to the sequencer that sends sequenced data blocks.

35. The multi-link service card of claim 34, further comprising:
a memory logic unit coupled to the input logic unit and the output logic unit for
storing at least part of the data blocks during sequencing.

5 36. The multi-link service card of claim 34, wherein the output unit fragments
sequenced data blocks.

37. The multi-link service card of claim 34, wherein the input logic unit includes an
input buffer, an unprocessed buffer and a parser.

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38. The multi-link service card of claim 34, wherein the output logic unit includes an
output buffer, a processed buffer and a fragmenter-assembler module.

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39. The multi-link service card of claim 35, wherein the memory logic unit includes a
memory device, a data memory control, and data state logic.

40. The multi-link service card of claim 34, wherein the sequencer unit includes a
reorder module.

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41. The multi-link service card of claim 34, wherein the sequencer unit includes a
packet builder for building packets from sequenced data blocks.

42. The multi-link service card of claim 34, wherein the sequencer unit includes a
quality of service handler for prioritizing packets.

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43. The multi-link service card of claim 34, wherein the sequencer unit includes a
reorder module, a packet builder, a sequencer memory device, sequencer memory control
and sequencer state logic.

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44. A method comprising:
receiving data blocks from multiple links,

storing sequence numbers for the data blocks in data queues in the order the data blocks were received, the data blocks received from each link being stored in a unique queue assigned to the respective link, and

5 selecting sequence numbers from each queue in sequence to sequence the data blocks.

45. The method of claim 44, wherein the data blocks are data packets.

46. The method of claim 44, wherein the data blocks are data fragments.

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47. The method of claim 44, further comprising polling head pointers of the queues for a particular sequence number.

48. The method of claim 47, further comprising polling head pointers of the queues for sequence numbers less than the particular sequence number and declaring an error upon detecting a sequence number less than the particular sequence number.

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49. The method of claim 44, further comprising moving header information associated with the selected sequence numbers to a processed memory location.

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50. A method comprising:
receiving data packets in one or more interface cards,
sending the data packets to a service card for prioritization; and
sending the prioritized data packets to the interface cards for communication to a
25 destination device over a computer network.

51. The method of claim 50, further comprising prioritizing the data packets by queuing the data packets according to header information.

52. The method of claim 51, further comprising maintaining multiple queues for a number of different bundles, wherein header information in the data packets includes information identifying a bundle and a priority.

52. The method of claim 51, further comprising maintaining multiple queues for a number of different bundles, wherein header information in the data packets includes information identifying a bundle and a priority.